

What is claimed is:

1. A system for allocating frequency allocations (FAs) to each of N sectors in a base transceiver station (BTS) for use in a mobile communication system, N being a positive integer, comprising:

means for determining d# and f#, each representing the number of dynamic FAs and the number of fixed FAs, respectively;

an array of sector amplifiers; and

means for switchably connecting the dynamic FAs to the sector amplifiers.

2. The system of claim 1, further comprising;

an array of combiners for combining the dynamic FAs and the fixed FAs and outputting into d# output signals.

3. The system of claim 2, wherein each of the sector amplifiers amplifies a corresponding output signal.

4. The system of claim 3, wherein each of the sector amplifiers includes:

a switchable divider for switchably dividing the corresponding signal;

a number of multi-carrier power amplifiers (MCPAs) for amplifying the divided signal; and

a switchable combiner for switchably combining the

amplified signal.

5. The system of claim 4, wherein the sector amplifier further includes:

5 a first switch for selectively connecting the corresponding signal to the MCPAs in the array of sector amplifiers; and

10 a second switch for selectively connecting the amplified signal to the switchable combiners in the array of sector amplifiers.

6. The system of claim 5, further comprising:

15 an array of isolation resistors for preventing interference between signals inputted into the sector amplifiers.

7. The system of claim 6, further comprising:

20 an array of phase shifters for matching the signals in phase.

8. The system of claim 4, wherein if  $j$  FAs are allocated to a selected sector amplifier, the corresponding switchable divider and combiners operate in  $j$ -way,  $j$  being a positive integer.

25 9. The system of claim 8, wherein in case when the  $j$  number of FAs allocates to the selected sector amplifier, each FA has

the same power level at an output port of the selected sector amplifier.

10. A base station (BS) for allocating FAs to each of N sectors incorporated therein, wherein N is a positive integer, comprising:

a controller for grouping N sectors into M small groups and determining d and f for a small group, M being positive integer, d and f representing the number of dynamic FAs and the number of fixed FAs, respectively;

d number of combiners for combining the fixed FAs and the dynamic FAs for said each small group and outputting d number of signals;

d number of switchable power divider/combiners; and

d number of first switches for selectively switching the output signals to the switchable power divider/combiners, whereby the switchable power divider/combiners amplify signals inputted thereto at the same power level.

11. The base station of claim 10, wherein the controller calculates N, M, d and f by using a call request information corresponding to each sector.

12. The base station of claim 11, wherein the call request information is retrieved from a mobile switching center.

13. The base station of claim 12, wherein the controller

calculates N, M, d and f by using the number of subscribers located in each sector of a target base station.

14. The base station of claim 13, wherein information for the subscriber's number is retrieved from a mobile switching center.

15. The base station of claim 10, wherein the controller is located at the BTC.

16. The base station of claim 10, wherein the controller is located at a call control processor (CCP).

17. The base station of claim 10, wherein the fixed FAs are allocated to all of the combiners.

18. The base station of claim 10, wherein said switchable power divider/combiner includes:

d number of switchable power dividers, each dividing a signal inputted thereto into a number of divided signals, wherein each of the switchable power dividers is capable of controlling the number of divided signals;

a number of multi-carrier power amplifiers (MCPAs) for amplifying the divided signals; and

d number of switchable power combiners, each combining a number of input signals inputted thereto into an output signal, wherein each of the switchable power combiners is

capable of controlling the number of input signals.

19. The base station of claim 18, wherein if  $j$  FAs are allocated to a predetermined sector, the corresponding switchable power dividers and combiners operates in  $j$ -way,  $j$  being a positive integer.

20. The base station of claim 18, wherein the number of MCPAs is the number of total FAs which is the sum of  $d$  and  $f$ .

21. The base station of claim 18, the switchable power divider/combiner further includes:

$d$  number of second switches for selectively switching the divided signals from the switchable power dividers to the MCPAs; and

$d$  number of third switches for selectively switching signals amplified by the MCPAs to the switchable power combiners.

22. The base station of claim 18, wherein each of the switchable power dividers includes:

an input port for receiving an input signal;

a common node;

$k$  number of first transmission lines,  $k$  being a positive integer;

$k$  number of second transmission lines;

$k$  number of isolation elements disposed between the first

and the second transmission lines, wherein each isolation element is electrically connected to a corresponding first and second transmission lines, respectively;

k number of output ports for outputting k number of output signals, each of the output ports is connected to a portion between a corresponding isolation element and a first or a second transmission line;

k number of fourth switches for selectively switching the input signal to the first transmission lines; and

k number of fifth switches for selectively switching the common node to the second transmission lines based on the first switches.

23. The base station of claim 22, k is equal to  $f/d + d$ .

24. The base station of claim 23, wherein each of the combiners includes:

an output port for outputting an output signal;

a common node;

k number of first transmission lines;

k number of second transmission lines;

k number of isolation elements disposed between the first and the second transmission lines, wherein each isolation element is electrically connected to a corresponding first and second transmission lines, respectively;

k number of input ports for receiving k number of input signals, each of the input ports is connected to a portion

between a corresponding isolation element and a first or a second transmission line;

k number of sixth switches for selectively switching the input signal to the first transmission lines; and

5 k number of seventh switches for selectively switching the common node to the second transmission lines based on the first switches.

25. The base station of claim 24, wherein a power level of  
10 each FA becomes to the same value at each output port of the switchable combiners.

26. The base station of claim 24, wherein each of the first  
15 and the third switches has the number of output ports to be equal to d.

27. The base station of claim 26, wherein each of the second switches has the number of input ports to be equal to d.

20 28. The base station of claim 18, further comprising:

d number of antennas electrically connected to said MCPAs, wherein each of the antenna converts the amplified signals into radio frequency (RF) signals to be sent into each the sector in the small group, respectively.

25 29. The base station of claim 23, further comprising:

k number of isolation resistors for preventing

interference between signals inputted to each combiners.

30. The base station of claim 25, further comprising:

k number of phase shifters in front of said each  
5 combiners for controlling phases of signals inputted thereto.

31. The base station of claim 10, wherein N is equal to 6 so  
as to apply a BTS for use in IMT 2000 communication system.

10 32. A method for allocating FAs to N sectors of a service  
area in a base transceiver station (BTS) for use in a wireless  
communication system, N being a positive integer, comprising  
the steps of:

a) grouping said N sectors into a plurality of small  
15 groups based on subscriber's information; and

b) determining the number of dynamic FAs and the number  
of fixed FAs for each small group based on the subscriber's  
information.

20 33. The method of claim 32, further comprising the step of:

c) setting the number of switches, the number of  
switchable power divider/combiners and the number of ports  
based on the number of dynamic FAs and the number of fixed  
FAs.

25 34. The method of claim 33, further comprising the steps of:

d) amplifying the dynamic and the fixed FAs by using an



array of sector amplifiers; and

e) switchably connecting the dynamic FAs to the array of sector amplifiers.

5 35. The method of claim 34, wherein said amplifying step d) includes the steps of:

d1) combining the dynamic and the fixed FAs by using an array of fixed combiners;

10 d2) switchably dividing the combined FAs by using an array of switchable dividers;

d3) amplifying the combined signals by using a multiple number of multi-carrier power amplifiers (MCPAs); and

15 d4) combining the amplified FAs into s# output signals to be sent to sectors in a corresponding small group, respectively, by using an array of switchable combiners, s# representing the number of total FAs per small group.

36. The method of claim 35, wherein the number of fixed combiners is equal to that of the dynamic FAs.

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37. The method of claim 36, wherein the number of input ports of each fixed combiner is defined as:

$$k = f\#/d\# + d\#$$

25 wherein k, f# and d# represent the number of input ports per fixed combiner, the number of fixed FAs and the number of dynamic FAs, respectively.

38. The method of claim 37, wherein the number of MCPAs is equal to  $s\#$ , which is the sum of  $f\#$  and  $d\#$ .

39. The method of claim 38, wherein  $f\#/d\#$  is greater than 1.

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40. The method of claim 37, wherein each of the switchable power dividers and combiners operates at  $d\#$ -way in a maximum operating mode.

10 41. The method of claim 35, wherein  $j$  FAs are allocated to a predetermined sector, the corresponding switchable divider and combiner operate in  $j$ -way,  $j$  being a positive integer.

15 42. The method of claim 32, wherein the subscriber's information is a call request information corresponding to each sector.

43. The method of claim 42, wherein the call request information is retrieved from a mobile switching center.

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44. The method of claim 32, wherein the subscriber's information is the number of subscribers located in each sector of a target base station.

25 45. The method of claim 44, wherein information for the subscriber's number is retrieved from a mobile switching center.

